

(R) RIVETS AND RIVETING

Foreword—This Document has also changed to comply with the new SAE Technical Standards Board format.

1. Scope

2. References—There are no referenced publications specified herein.

3. General Specifications for Small Solid Rivets

3.1 General—This small solid rivet standard covers the complete general and dimensional data for flat head, pan head, button head, truss head, countersunk head, copper's, tinner's and belt rivets. Design and assembly data are given in the Appendix—Rivet Selection and Design Considerations.

The inclusion of dimensional data in this standard is not intended to imply that all of the products described are stock production sizes. Consumers are requested to consult with manufacturers concerning stock production sizes.

3.2 Tolerances—The tolerances given on the dimensional tables are those for rivets made by the normal cold heading process. The tolerance for rivets made by the hot heading or forging process shall be as agreed upon between the purchaser and supplier.

3.3 Heads—Because the heads of these rivets are not machined or trimmed, the circumference may be slightly irregular and the edges may be rounded or flat.

3.4 Underhead Fillets—Rivets, other than countersunk type, shall be furnished with a definite fillet under the head but radius of fillet shall not exceed 10% of maximum shank diameter or 0.03 in., whichever is the smaller.

3.5 Material—Rivets shall be steel, copper, brass, aluminum, or other metals as specified by purchaser.

Suitable material for steel small solid rivets is covered by SAE Recommended Practice, Mechanical and Chemical Requirements for Non-threaded Fasteners—SAE J430.

Requirements of rivets made from other materials shall be as agreed upon between the purchaser and supplier.

SAE Technical Standards Board Rules provide that: "This report is published by SAE to advance the state of technical and engineering sciences. The use of this report is entirely voluntary, and its applicability and suitability for any particular use, including any patent infringement arising therefrom, is the sole responsibility of the user."

SAE reviews each technical report at least every five years at which time it may be reaffirmed, revised, or cancelled. SAE invites your written comments and suggestions.

QUESTIONS REGARDING THIS DOCUMENT: (724) 772-8512 FAX: (724) 776-0243
TO PLACE A DOCUMENT ORDER: (724) 776-4970 FAX: (724) 776-0790
SAE WEB ADDRESS <http://www.sae.org>

3.6 Points—Unless otherwise specified, rivets shall have plain sheared ends. Ends shall be at right angles, within 2 deg, to the axis of the rivet and the end shall be reasonably flat, sufficient for the purpose of driving that end satisfactorily. When so specified, rivets with standard upset points are obtainable on lengths up to the maximum lengths shown in Table 1.

3.7 Workmanship—Rivets shall be free from surface seams, loose scale, and all other defects that might affect their serviceability.

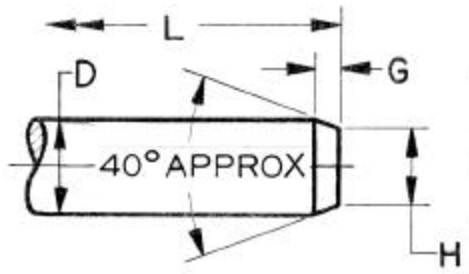


TABLE 1—DIMENSIONS OF STANDARD POINTS FOR SMALL SOLID RIVETS

Nominal Size or Basic Shank Dia	G Point Length Ref	H Point Dia Approx ⁽¹⁾	L Rivet Length Max
1/16 0.062	0.015	0.051	9/16
3/32 0.094	0.023	0.077	3/4
1/8 0.125	0.031	0.102	3/4
5/32 0.156	0.039	0.127	1
3/16 0.188	0.047	0.154	1
7/32 0.219	0.055	0.179	1-3/8
1/4 0.250	0.062	0.204	1-3/8
9/32 0.281	0.070	0.230	1-1/2
5/16 0.312	0.078	0.255	1-1/2
11/32 0.344	0.086	0.281	1-5/8
3/8 0.375	0.094	0.307	1-5/8
13/32 0.406	0.102	0.332	2
7/16 0.438	0.110	0.358	3

1. No standard tolerances are contemplated.

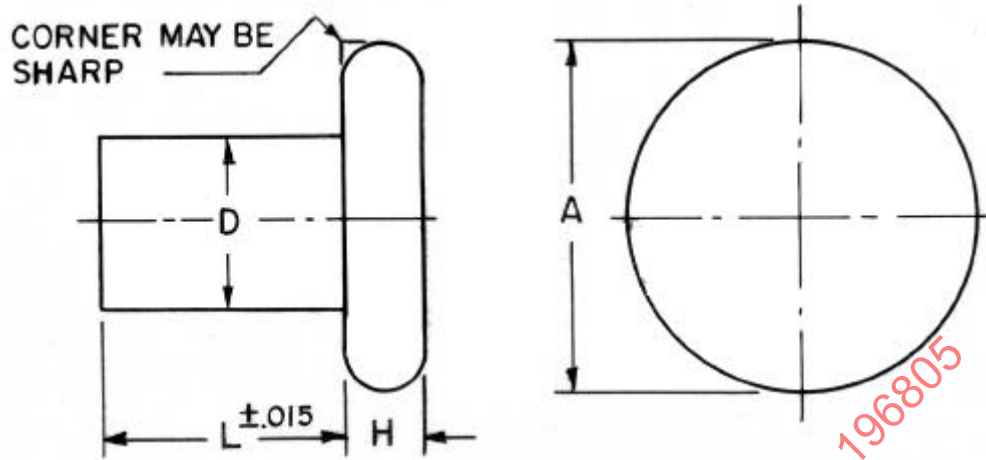


TABLE 2—FLAT HEAD RIVETS

Nominal Size or Basic Shank Dia	D Dia of Shank Max	D Dia of Shank Min	A Dia of Head Max	A Dia of Head Min	H Height of Head Max	H Height of Head Min
1/16 0.062	0.065	0.059	0.140	0.120	0.027	0.017
3/32 0.094	0.096	0.090	0.200	0.180	0.038	0.026
1/8 0.125	0.127	0.121	0.260	0.240	0.048	0.036
5/32 0.156	0.158	0.152	0.323	0.301	0.059	0.045
3/16 0.188	0.191	0.182	0.307	0.361	0.069	0.055
7/32 0.219	0.222	0.213	0.453	0.427	0.080	0.065
1/4 0.250	0.253	0.244	0.515	0.485	0.091	0.075
9/32 0.281	0.285	0.273	0.579	0.545	0.103	0.085
5/16 0.312	0.316	0.304	0.641	0.607	0.113	0.095
11/32 0.344	0.348	0.336	0.705	0.667	0.124	0.104
3/8 0.375	0.380	0.365	0.769	0.731	0.135	0.115
13/32 0.406	0.411	0.396	0.834	0.790	0.146	0.124
7/16 0.438	0.443	0.428	0.896	0.852	0.157	0.135

For dimensions and tolerances not specified above, see General Specifications.

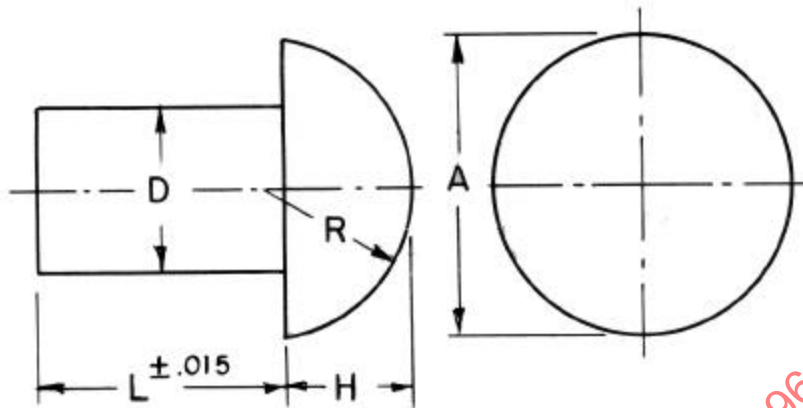


TABLE 3—BUTTON HEAD RIVETS

Nominal Size or Basic Shrink Dia	D Dia of Shank Max	D Dia of Shank Min	A Dia of Head Max	A Dia of Head Min	H Height of Head Max	H Height of Head Min	R Rad of Head Approx
1/16 0.062	0.065	0.059	0.122	0.102	0.052	0.042	0.055
3/32 0.094	0.096	0.090	0.182	0.162	0.077	0.065	0.084
1/8 0.125	0.127	0.121	0.235	0.215	0.100	0.088	0.111
5/32 0.156	0.158	0.152	0.290	0.268	0.124	0.110	0.138
3/16 0.188	0.191	0.182	0.348	0.322	0.147	0.133	0.166
7/32 0.219	0.222	0.213	0.405	0.379	0.172	0.158	0.195
1/4 0.250	0.253	0.244	0.460	0.430	0.196	0.180	0.221
9/32 0.281	0.285	0.273	0.518	0.484	0.220	0.202	0.249
5/16 0.312	0.316	0.304	0.572	0.538	0.243	0.225	0.276
11/32 0.344	0.348	0.336	0.630	0.592	0.267	0.247	0.304
3/8 0.375	0.380	0.365	0.684	0.646	0.291	0.271	0.332
13/32 0.406	0.411	0.396	0.743	0.699	0.316	0.294	0.358
7/16 0.438	0.443	0.428	0.798	0.754	0.339	0.317	0.387

For dimensions and tolerances not specified above, see General Specifications.

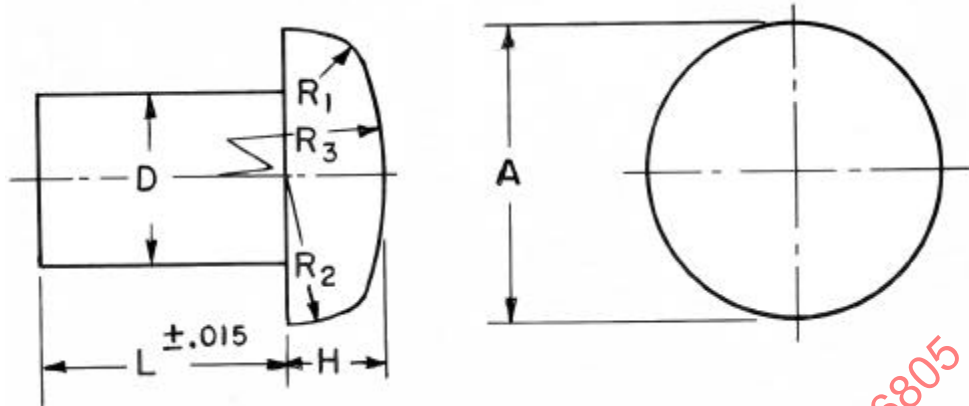


TABLE 4—PAN HEAD RIVETS

Nominal Size or Basic Shank Dia	D Dia of Shank Max	D Dia of Shank Min	A Dia of Head Max	A Dia of Head Min	H Height of Head Max	H Height of Head Min	Radii of Head R_1 Approx	Radii of Head R_2 Approx	Radii of Head R Approx
1/16 0.062	0.065	0.059	0.118	0.098	0.040	0.030	0.019	0.052	0.217
3/32 0.094	0.096	0.090	0.173	0.153	0.060	0.048	0.030	0.080	0.326
1/8 0.125	0.127	0.121	0.225	0.205	0.078	0.066	0.039	0.106	0.429
5/32 0.156	0.158	0.152	0.279	0.257	0.096	0.082	0.049	0.133	0.535
3/16 0.188	0.191	0.182	0.334	0.308	0.114	0.100	0.059	0.159	0.641
7/32 0.219	0.222	0.213	0.391	0.365	0.133	0.119	0.069	0.186	0.754
1/4 0.250	0.253	0.244	0.444	0.414	0.151	0.135	0.079	0.213	0.858
9/32 0.281	0.285	0.273	0.499	0.465	0.170	0.152	0.088	0.239	0.963
5/16 0.312	0.316	0.304	0.552	0.518	0.187	0.169	0.098	0.266	1.070
11/32 0.344	0.348	0.336	0.608	0.570	0.206	0.186	0.108	0.292	1.176
3/8 0.375	0.380	0.365	0.663	0.625	0.225	0.205	0.118	0.319	1.286
13/32 0.406	0.411	0.396	0.719	0.675	0.243	0.221	0.127	0.345	1.392
7/16 0.438	0.443	0.428	0.772	0.728	0.261	0.239	0.137	0.372	1.500

For dimensions and tolerances not specified above, see General Specifications.

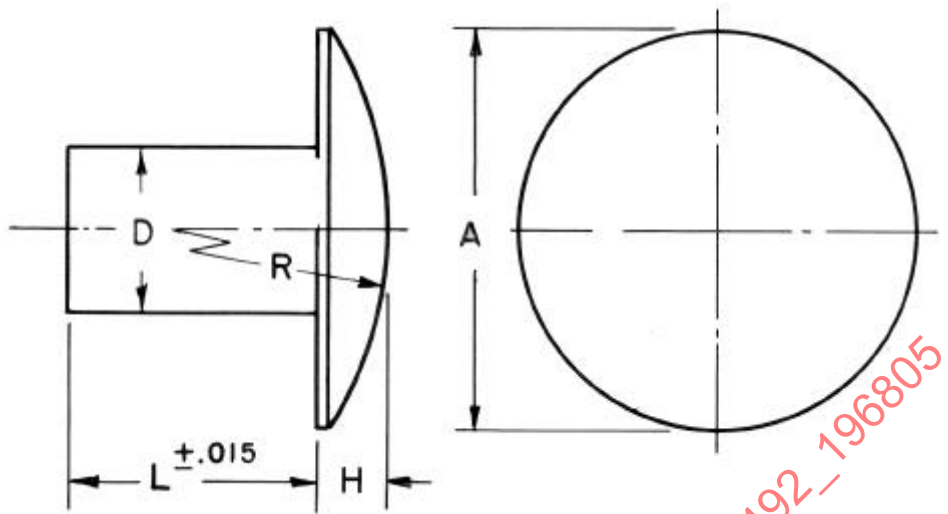


TABLE 5—TRUSS HEAD OR WAGON BOX RIVETS

Nominal Size or Basic Shank Dia	D Dia of Shank Max	D Dia of Shank Min	A Dia of Head Max	A Dia of Head Min	H Height of Head Max	H Height of Head Min	R Radius of Head Approx
3/32 0.094	0.096	0.090	0.226	0.206	0.038	0.026	0.239
1/8 0.125	0.127	0.121	0.297	0.277	0.048	0.036	0.314
5/32 0.156	0.158	0.152	0.368	0.348	0.059	0.045	0.392
3/16 0.188	0.191	0.182	0.442	0.422	0.069	0.055	0.470
7/32 0.219	0.222	0.213	0.515	0.495	0.080	0.066	0.555
1/4 0.250	0.253	0.244	0.590	0.560	0.091	0.075	0.628
9/32 0.281	0.285	0.273	0.661	0.631	0.103	0.085	0.706
5/16 0.312	0.316	0.304	0.732	0.702	0.113	0.095	0.784
11/32 0.344	0.348	0.336	0.806	0.776	0.124	0.104	0.862
3/8 0.375	0.380	0.365	0.878	0.848	0.135	0.115	0.942
13/32 0.406	0.411	0.396	0.949	0.919	0.145	0.123	0.128
7/16 0.438	0.443	0.428	1.020	0.990	0.157	0.135	1.098

For dimensions and tolerances not specified above, see General Specifications.

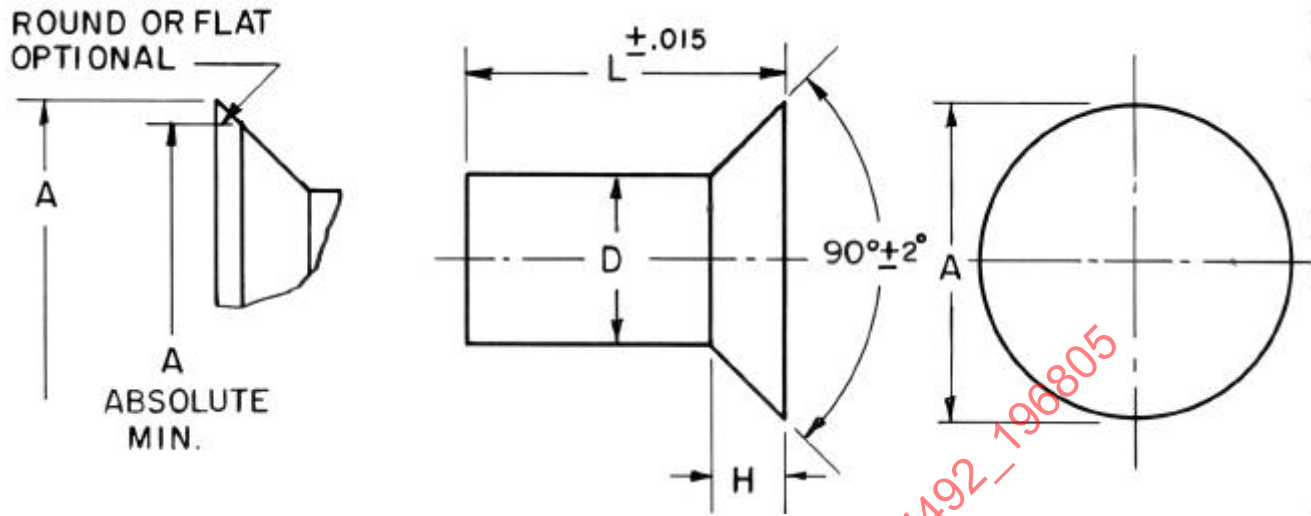


TABLE 6—COUNTERSUNK HEAD RIVETS

Nominal Size or Basic Shank Dia	D Dia of Shank Max	D Dia of Shank Min	A Dia of Head Max Sharp	A Dia of Head Abs Min	H ⁽¹⁾ Height of Head
1/16 0.062	0.065	0.059	0.118	0.110	0.027
3/32 0.094	0.096	0.090	0.176	0.163	0.040
1/8 0.125	0.127	0.121	0.235	0.217	0.053
5/32 0.156	0.158	0.152	0.293	0.272	0.066
3/16 0.188	0.191	0.182	0.351	0.326	0.079
7/32 0.219	0.222	0.213	0.413	0.384	0.094
1/4 0.250	0.253	0.244	0.469	0.437	0.106
9/32 0.281	0.285	0.273	0.528	0.491	0.119
5/16 0.312	0.316	0.304	0.588	0.547	0.133
11/32 0.344	0.348	0.336	0.646	0.602	0.146
3/8 0.375	0.380	0.365	0.704	0.656	0.159
13/32 0.406	0.411	0.396	0.763	0.710	0.172
7/16 0.438	0.443	0.428	0.823	0.765	0.186

- Height of head, H, is given for construction purposes only. Variations in this dimension are controlled by the diameters A and D and the included angle of the head.

For dimensions and tolerances not specified above, see General Specifications.

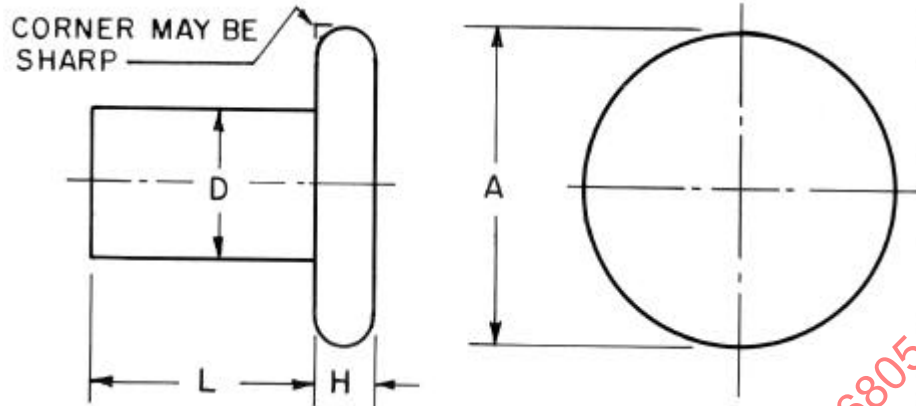


TABLE 7—TINNERS' RIVETS

Nominal Size ⁽¹⁾	D Dia of Shank Max	D Dia of Shank Min	A Dia of Head Max	A Dia of Head Min	H Height of Head Max	H Height of Head Min	Length Max	Length Min
6 oz	0.081	0.075	0.213	0.193	0.028	0.016	0.135	0.115
8 oz	0.091	0.085	0.225	0.205	0.036	0.024	0.166	0.146
10 oz	0.097	0.091	0.250	0.230	0.037	0.025	0.182	0.162
12 oz	0.107	0.101	0.265	0.245	0.037	0.025	0.198	0.178
14 oz	0.111	0.105	0.275	0.255	0.038	0.026	0.198	0.178
1 lb	0.113	0.107	0.285	0.265	0.040	0.028	0.213	0.193
1-1/4 lb	0.122	0.116	0.295	0.275	0.045	0.033	0.229	0.209
1-1/2 lb	0.132	0.126	0.316	0.294	0.046	0.034	0.244	0.224
1-3/4 lb	0.136	0.130	0.331	0.309	0.049	0.035	0.260	0.240
2 lb	0.146	0.140	0.341	0.319	0.050	0.036	0.276	0.256
2-1/2 lb	0.150	0.144	0.311	0.289	0.069	0.055	0.291	0.271
3 lb	0.163	0.154	0.329	0.303	0.073	0.059	0.323	0.303
3-1/2 lb	0.168	0.159	0.348	0.322	0.074	0.060	0.338	0.318
4 lb	0.179	0.170	0.368	0.342	0.076	0.062	0.354	0.334
5 lb	0.190	0.181	0.388	0.362	0.084	0.070	0.385	0.365
6 lb	0.206	0.197	0.419	0.393	0.090	0.076	0.401	0.381
7 lb	0.223	0.214	0.431	0.405	0.094	0.080	0.416	0.396
8 lb	0.227	0.218	0.475	0.445	0.101	0.085	0.448	0.428
9 lb	0.241	0.232	0.490	0.460	0.103	0.087	0.463	0.443
10 lb	0.241	0.232	0.505	0.475	0.104	0.088	0.479	0.459
12 lb	0.263	0.251	0.532	0.498	0.108	0.090	0.510	0.490
14 lb	0.288	0.276	0.577	0.543	0.113	0.095	0.525	0.505
16 lb	0.304	0.292	0.597	0.563	0.128	0.110	0.541	0.521
18 lb	0.347	0.335	0.706	0.668	0.156	0.136	0.603	0.583

1. Nominal size refers to the approximate weight of 1,000 rivets.
For dimensions and tolerances not specified above, see General Specifications.

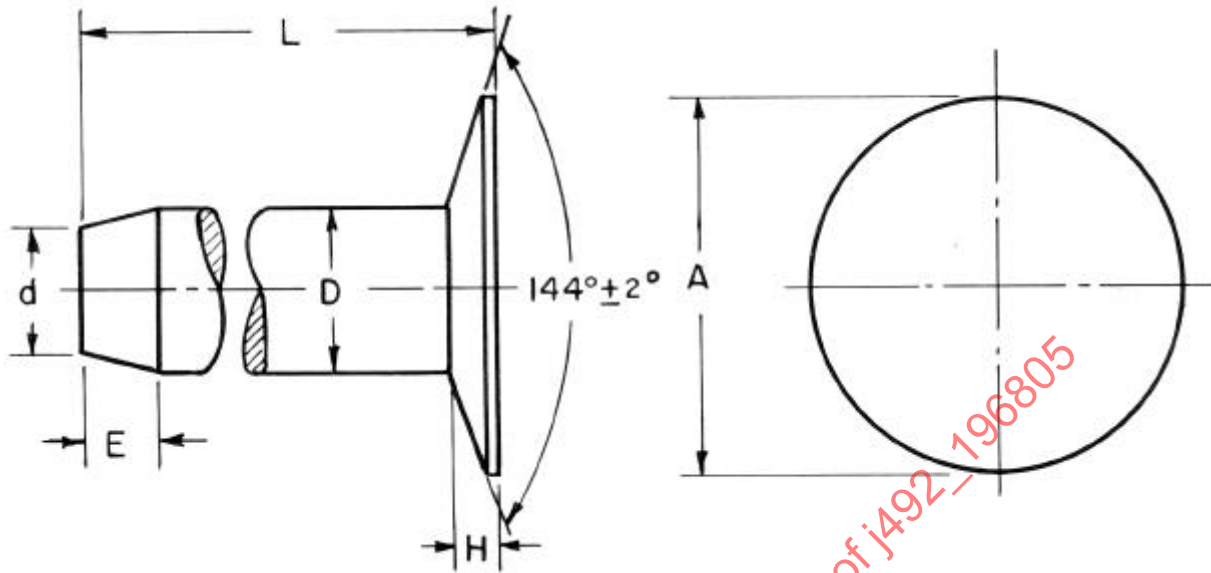


TABLE 8—COOPERS' RIVETS

Nominal Size ⁽¹⁾	D Dia of Shank Max	D Dia of Shank Min	A Dia of Head Max	A Dia of Head Min	H Height of Head Max	H Height of Head Min	Point d Dia Approx	Point E Length Approx	L Length Max	L Length Min
1 lb	0.111	0.105	0.291	0.271	0.045	0.031	Not Pointed		0.249	0.219
1-1/4	0.122	0.116	0.324	0.302	0.050	0.036	Not Pointed		0.285	0.255
1-1/2	0.132	0.126	0.324	0.302	0.050	0.036	Not Pointed		0.285	0.255
1-3/4	0.136	0.130	0.324	0.302	0.052	0.034	Not Pointed		0.318	0.284
2	0.142	0.136	0.355	0.333	0.056	0.038	Not Pointed		0.322	0.288
3	0.158	0.152	0.386	0.364	0.058	0.040	0.123	0.062	0.387	0.353
4	0.168	0.159	0.388	0.362	0.058	0.040	0.130	0.062	0.418	0.388
5	0.183	0.174	0.419	0.393	0.063	0.045	0.144	0.062	0.454	0.420
6	0.206	0.197	0.482	0.456	0.073	0.051	0.160	0.094	0.498	0.457
7	0.223	0.214	0.513	0.487	0.076	0.054	0.175	0.094	0.561	0.523
8	0.241	0.232	0.546	0.516	0.081	0.059	0.182	0.094	0.597	0.559
9	0.248	0.239	0.578	0.548	0.085	0.063	0.197	0.094	0.601	0.563
10	0.253	0.244	0.578	0.548	0.085	0.063	0.197	0.094	0.632	0.594
12	0.263	0.251	0.580	0.546	0.086	0.060	0.214	0.094	0.633	0.575
14	0.275	0.263	0.611	0.577	0.091	0.065	0.223	0.094	0.670	0.612
16	0.285	0.273	0.611	0.577	0.089	0.063	0.223	0.094	0.699	0.641
18	0.285	0.273	0.642	0.608	0.108	0.082	0.230	0.125	0.749	0.691
20	0.316	0.304	0.705	0.671	0.128	0.102	0.250	0.125	0.769	0.711
3/8	0.380	0.365	0.800	0.762	0.136	0.106	0.312	0.125	0.840	0.778

1. Nominal size refers to the approximate weight of 1,000 rivets.
For dimensions and tolerances not specified above, see General Specifications.

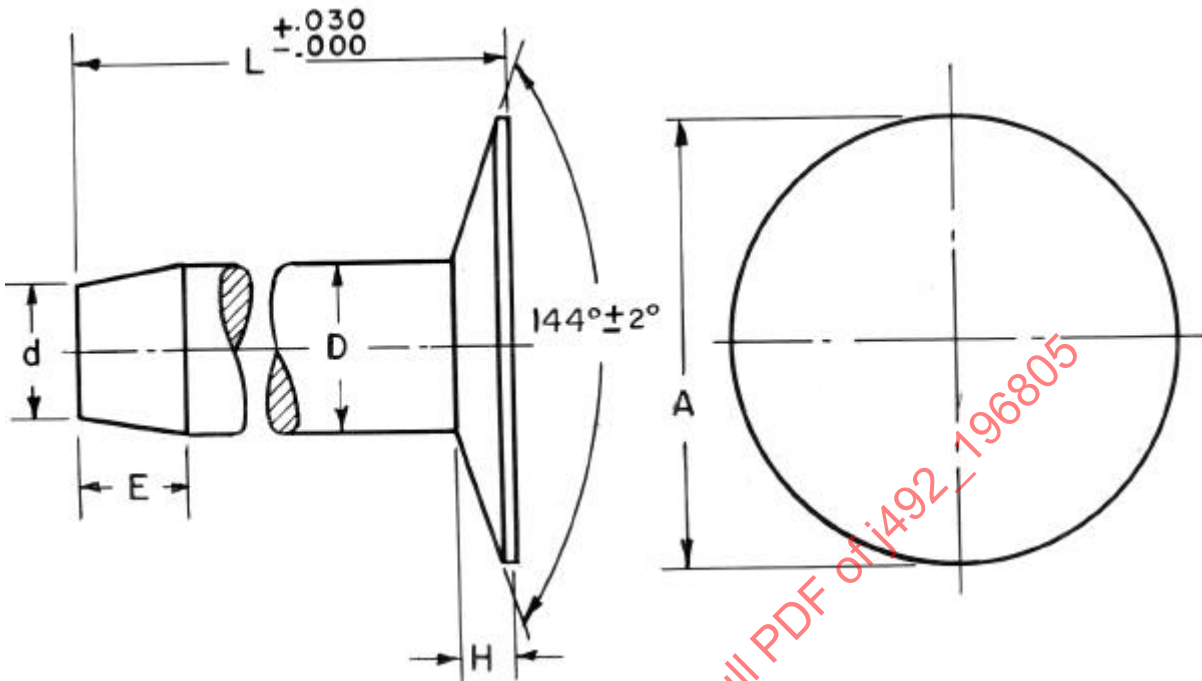


TABLE 9—BELT RIVETS

Nominal Size ⁽¹⁾	D Dia of Shank Max	D Dia of Shank Min	A Dia of Head Max	A Dia of Head Min	H Height of Head Max	H Height of Head Min	Point d Dia Approx	Point E Length Approx
14	0.085	0.079	0.260	0.240	0.042	0.030	0.065	0.078
13	0.097	0.091	0.322	0.302	0.051	0.039	0.073	0.078
12	0.111	0.105	0.353	0.333	0.054	0.040	0.083	0.078
11	0.122	0.116	0.383	0.363	0.059	0.045	0.097	0.078
10	0.136	0.130	0.417	0.395	0.065	0.047	0.109	0.094
9	0.150	0.144	0.448	0.426	0.069	0.051	0.122	0.094
8	0.167	0.161	0.481	0.455	0.072	0.054	0.135	0.094
7	0.183	0.174	0.513	0.487	0.075	0.056	0.151	0.125
6	0.206	0.197	0.606	0.580	0.090	0.068	0.165	0.125
5	0.223	0.214	0.700	0.674	0.105	0.083	0.185	0.125
4	0.241	0.232	0.921	0.893	0.138	0.116	0.204	0.141

1. Nominal size refers to the Stubs iron wirge gage number of the stock used in the shank of the rivet. For dimensions and tolerances not specified above, see General Specifications.

4. General Specifications For Tubular Rivets

- 4.1 General**—This tubular rivet standard covers the complete general and dimensional data for oval head, truss head, flat head, 90- and 120-deg countersunk head semitubular rivets and oval head, truss head and countersunk head full tubular rivets. Design and assembly data are given in the Appendix—Rivet Selection and Design Considerations.

The inclusion of dimensional data in this standard is not intended to imply that all of the products described are stock production sizes. Consumers are requested to consult with manufacturers concerning stock production sizes.

- 4.2 Heads**—The bearing surface of flat, oval, and truss head rivets shall be at right angles to the axis of the body within 2 deg. Heads of all tubular rivets shall not be eccentric with the shank beyond a tolerance of 3% of the maximum head diameter. Because the heads are not machined or trimmed, the circumference may be slightly irregular and the edges rounded or flat.

- 4.3 Underhead Fillets**—Rivets, other than countersunk type, shall be furnished with a definite fillet under the head but radius of fillet shall not exceed 10% of maximum shank diameter.

- 4.4 Material**—Tubular rivets shall be low carbon steel, or brass, standard with manufacturer; or stainless steel, aluminum, copper, or other metals as agreed upon between the purchaser and supplier.

- 4.5 Length**—Length of rivets shall be measured as indicated in the illustrations for each head style. Tubular rivets are available in length increments specified in Table 10.

Tolerance on length of tubular rivets shall be as specified in Table 11.

- 4.6 Workmanship**—Tubular rivet end irregularities shall not be such that usability of the rivet is impaired. Rivets shall be free from surface seams, splits, and all other defects that might affect their serviceability.

TABLE 10—LENGTH INCREMENTS AND MINIMUM LENGTHS

Nominal Size	Length Increments	Min Lengths Right Angle Heads	Min Lengths 90 deg Csk Heads	Min Lengths 120 deg Csk Heads
1/16	1/64	1/16	—	—
5/64	1/64	5/64	—	—
3/32	1/64	5/64 ⁽¹⁾	1/8 ⁽¹⁾	7/64 ⁽¹⁾
7/64	1/64	3/32	—	—
1/8	1/64	7/64 ⁽¹⁾	11/64 ⁽¹⁾	5/32 ⁽¹⁾
9/64	1/32	1/8 ⁽¹⁾	3/16 ⁽¹⁾	3/16 ⁽¹⁾
3/16	1/32	5/32 ⁽¹⁾	1/4 ⁽¹⁾	1/4 ⁽¹⁾
7/32	1/16	3/16 ⁽¹⁾	5/16 ⁽¹⁾	9/32 ⁽¹⁾
1/4	1/16	7/32 ⁽¹⁾	11/32 ⁽¹⁾	5/16 ⁽¹⁾
5/16	1/16	1/4 ⁽¹⁾	—	—

1. Hole depth to point of apex shall not exceed shank length for straight hole rivets of these lengths.

TABLE 11—TOLERANCES ON LENGTH

Nominal Size	Rivet Length To and Including 4 x Dia Tolerance	Rivet Length Over 4 Dia to and Including 8 x Dia Tolerance	Rivet Length Over 8 x Dia Tolerance
1/16	±0.007	±0.008	±0.010
5/64	±0.007	±0.008	±0.010
3/32	±0.007	±0.008	±0.010
7/64	±0.007	±0.008	±0.010
1/8	±0.007	±0.010	±0.015
9/64	±0.010	±0.012	±0.015
3/16	±0.010	±0.012	±0.015
7/32	±0.010	±0.015	±0.020
1/4	±0.010	±0.015	±0.020
5/16	±0.010	±0.015	±0.020

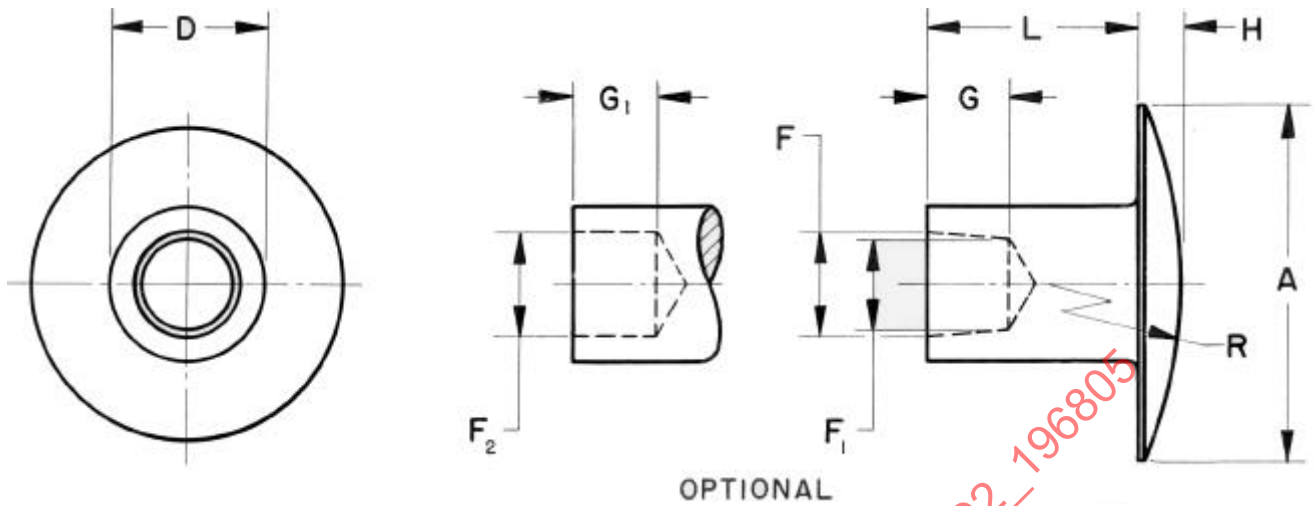


TABLE 12—DIMENSIONS OF OVAL HEAD SEMITUBULAR RIVETS

Nominal Size	D Dia of Shank Max	D Dia of Shank Min	A Dia of Head Max	A Dia of Head Min	H Height of Head Max	H Height of Head Min	Tapered Hole Dia F Max	Tapered Hole Dia F Min	Tapered Hole Dia F1 Min	Tapered Hole G Depth Min	Straight Hole F2 Dia Max	Straight Hole F2 Dia Min	Straight Hole G1 Depth Max	Straight Hole G1 Depth Min	R Head Radius (Ref) Min
1/16	0.061	0.058	0.114	0.104	0.020	0.014	0.046	0.042	0.036	0.042	0.044	0.039	0.057	0.042	0.084
5/64	0.075	0.072	0.133	0.123	0.023	0.017	0.053	0.047	0.040	0.053	0.051	0.045	0.068	0.053	0.101
3/32	0.089	0.085	0.152	0.142	0.026	0.020	0.069	0.065	0.057	0.057	0.068	0.062	0.072	0.057	0.120
7/64	0.099	0.095	0.192	0.182	0.032	0.026	0.076	0.072	0.063	0.065	0.076	0.070	0.088	0.073	0.158
1/8	0.123	0.118	0.223	0.213	0.038	0.030	0.095	0.091	0.079	0.082	0.090	0.084	0.104	0.089	0.183
9/64	0.146	0.141	0.239	0.229	0.045	0.035	0.112	0.106	0.091	0.104	0.107	0.100	0.135	0.120	0.182
3/16	0.188	0.182	0.318	0.306	0.065	0.055	0.145	0.139	0.120	0.135	0.141	0.134	0.166	0.151	0.232
7/32	0.217	0.210	0.444	0.430	0.075	0.061	0.166	0.150	0.136	0.151	0.163	0.155	0.198	0.183	0.381
1/4	0.252	0.244	0.507	0.493	0.085	0.071	0.191	0.181	0.155	0.183	0.184	0.176	0.229	0.214	0.439
5/16	0.310	0.302	0.570	0.554	0.100	0.086	0.235	0.225	0.201	0.214	0.219	0.211	0.260	0.245	0.473

For dimensions and tolerances not specified above, see General Specifications.

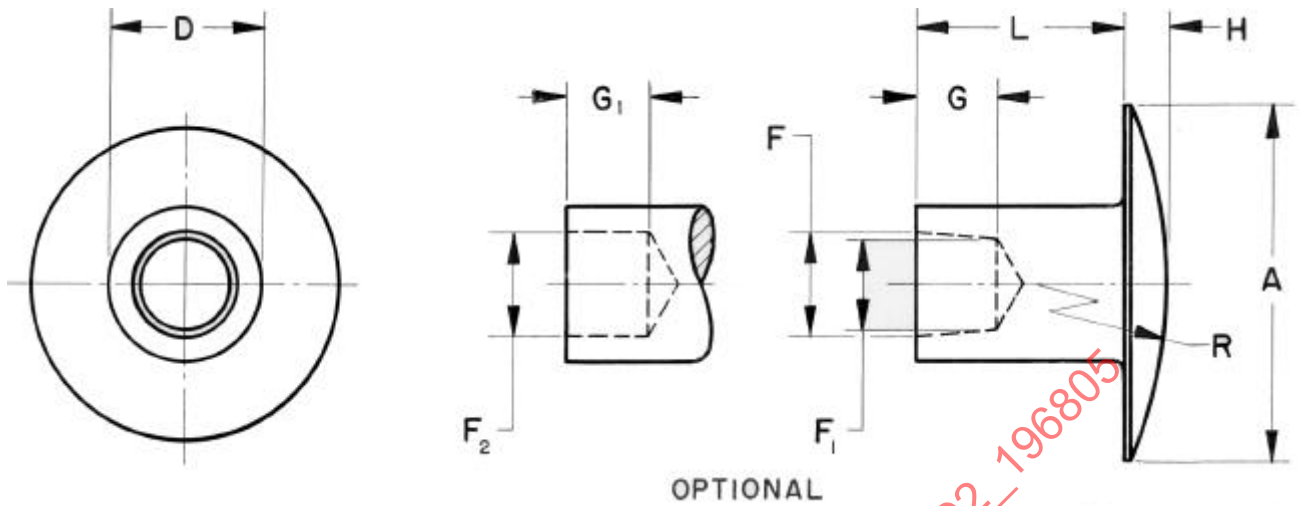


TABLE 13—DIMENSIONS OF TRUSS HEAD SEMITUBULAR RIVETS

Nominal Size	D Dia of Shank Max	D Dia of Shank Min	A Dia of Head Max	A Dia of Head Min	H Height of Head Max	H Height of Head Min	Tapered Hole Dia F Max	Tapered Hole Dia F Min	Tapered Hole Dia F1 Min	Tapered Hole G Depth Min	Straight Hole F2 Dia Max	Straight Hole F2 Dia Min	Straight Hole G1 Depth Max	Straight Hole G1 Depth Min	R Head Radius (Ref) Min
1/16	0.061	0.058	0.130	0.120	0.020	0.014	0.046	0.042	0.036	0.042	0.044	0.039	0.057	0.042	0.110
3/32	0.089	0.085	0.192	0.182	0.026	0.020	0.069	0.065	0.057	0.057	0.068	0.062	0.072	0.057	0.189
1/8	0.123	0.118	0.286	0.276	0.038	0.030	0.095	0.091	0.079	0.082	0.090	0.084	0.104	0.089	0.300
9/64	0.146	0.141	0.318	0.306	0.045	0.035	0.112	0.106	0.091	0.104	0.107	0.100	0.135	0.120	0.313
3/16	0.188	0.182	0.381	0.369	0.065	0.055	0.145	0.139	0.120	0.135	0.141	0.134	0.166	0.151	0.324

For dimensions and tolerances not specified above, see General Specifications.

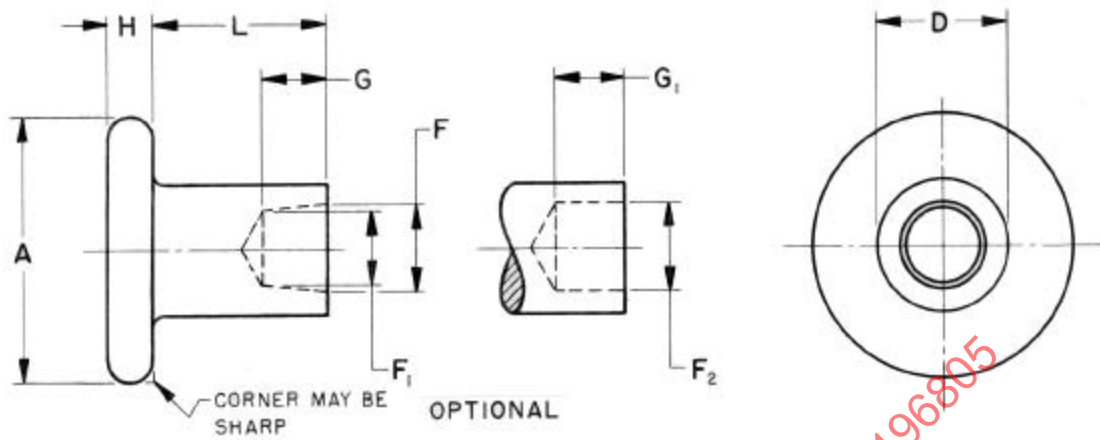


TABLE 14—DIMENSIONS OF FLAT HEAD SEMITUBULAR RIVETS

Nominal Size	D Dia of Shank Max	D Dia of Shank Min	A Dia of Head Max	A Dia of Head Min	H Height of Head Max	H Height of Head Min	Tapered Hole Dia F Max	Tapered Hole Dia F Min	Tapered Hole Dia F ₁ Min	Tapered Hole G Depth Min	Straight Hole F ₂ Dia Max	Straight Hole F ₂ Dia Min	Straight Hole G ₁ Depth Max	Straight Hole G ₁ Depth Min
1/16	0.061	0.058	0.114	0.104	0.027	0.023	0.046	0.042	0.036	0.042	0.044	0.039	0.057	0.042
3/32	0.089	0.085	0.161	0.151	0.034	0.028	0.069	0.065	0.057	0.057	0.068	0.062	0.072	0.057
1/8	0.123	0.118	0.223	0.213	0.041	0.034	0.095	0.091	0.079	0.082	0.090	0.084	0.104	0.089
9/64	0.146	0.141	0.317	0.307	0.052	0.042	0.112	0.106	0.091	0.104	0.107	0.100	0.135	0.120
3/16	0.188	0.182	0.381	0.369	0.067	0.057	0.145	0.139	0.120	0.135	0.141	0.134	0.166	0.151
1/4	0.252	0.244	0.507	0.493	0.090	0.076	0.191	0.181	0.155	0.183	0.184	0.176	0.229	0.214

For dimensions and tolerances not specified above, see General Specifications.

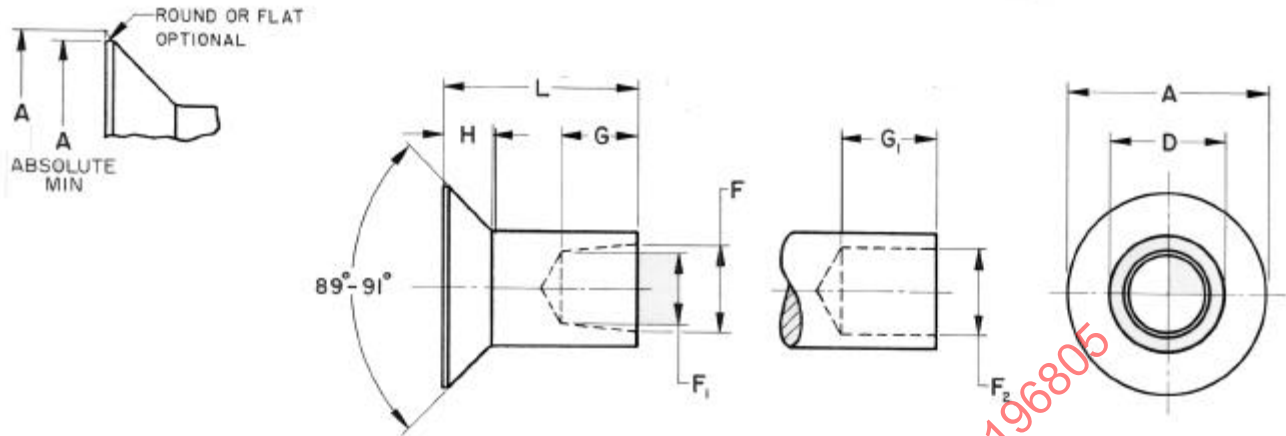


TABLE 15—DIMENSIONS OF 90 DEGREE COUNTERSUNK HEAD SEMITUBULAR RIVETS

Nominal Size	D Dia of Shank Max	A Dia of Shank Min	A Dia of Head Max Sharp	A Dia of Head Abs Sharp	H Height of Head Ref ⁽¹⁾	Tapered Hole Dia F Max	Tapered Hole Dia F Min	Tapered Hole Dia F ₁ Min	Tapered Hole G Depth Min	Straight Hole F ₂ Dia Max	Straight Hole F ₂ Dia Min	Straight Hole G ₁ Depth Max	Straight Hole G ₁ Depth Min
3/32	0.089	0.085	0.176	0.163	0.045	0.069	0.065	0.057	0.057	0.068	0.062	0.072	0.057
1/8	0.123	0.118	0.235	0.217	0.057	0.095	0.091	0.079	0.082	0.090	0.084	0.104	0.089
9/64	0.146	0.141	0.270	0.250	0.060	0.112	0.106	0.091	0.104	0.107	0.100	0.135	0.120
3/16	0.188	0.182	0.351	0.326	0.083	0.145	0.139	0.120	0.135	0.141	0.134	0.166	0.151
7/32	0.217	0.210	0.413	0.384	0.100	0.166	0.158	0.136	0.151	0.163	0.155	0.198	0.183
1/4	0.252	0.244	0.469	0.437	0.112	0.191	0.181	0.155	0.183	0.184	0.176	0.229	0.214

1. Height of head, H, is given for reference purposes only. Variations in this dimension are controlled by diameters A and D and included angle of the head.

For dimensions and tolerances not specified above, see General Specifications.

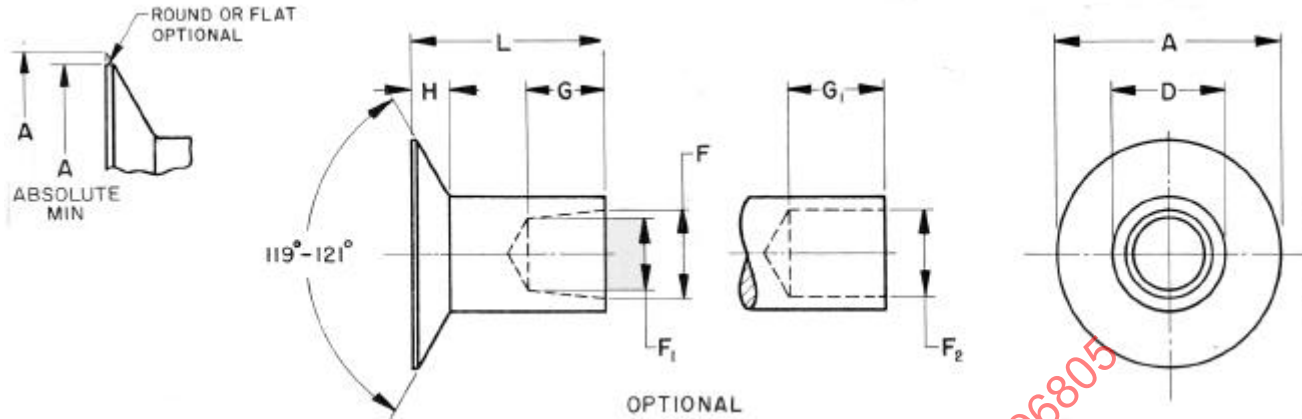


TABLE 16—DIMENSIONS OF 120 DEGREE COUNTERSUNK HEAD SEMITUBULAR RIVETS

Nominal Size	D Dia of Shank Max	D Dia of Shank Min	A Dia of Head Max Sharp	A Dia of Head Abs Min	H Height of Head Ref ⁽¹⁾	Tapered Hole Dia F Max	Tapered Hole Dia F Min	Tapered Hole Dia F ₁ Min	Tapered Hole G Depth Min	Straight Hole F ₂ Dia Max	Straight Hole F ₂ Dia Min	Straight Hole G ₁ Depth Max	Straight Hole G ₁ Depth Min
3/32	0.089	0.085	0.223	0.203	0.041	0.069	0.065	0.057	0.057	0.068	0.062	0.072	0.057
1/8	0.123	0.118	0.271	0.245	0.045	0.095	0.091	0.079	0.082	0.090	0.084	0.104	0.089
9/64	0.146	0.141	0.337	0.307	0.057	0.112	0.106	0.091	0.104	0.107	0.100	0.135	0.120
3/16	0.188	0.182	0.404	0.369	0.065	0.145	0.139	0.120	0.135	0.141	0.134	0.166	0.151
7/32	0.217	0.210	0.472	0.430	0.077	0.166	0.158	0.136	0.151	0.163	0.155	0.198	0.183
1/4	0.252	0.244	0.540	0.493	0.087	0.191	0.181	0.155	0.183	0.184	0.176	0.299	0.214

1. Height of head, H, is given for reference purposes only. Variations in this dimension are controlled by diameters A and D and included angle of the head.

For dimensions and tolerances not specified above, see General Specifications.

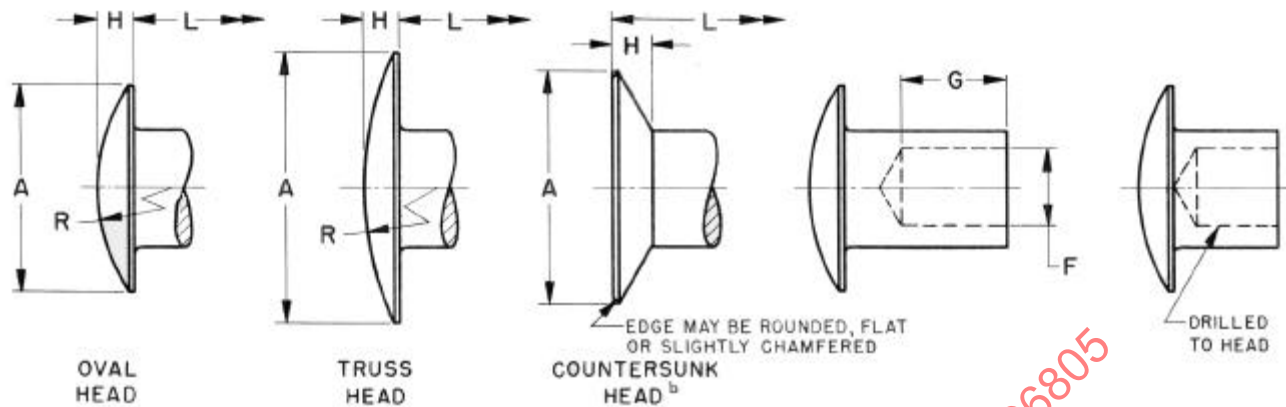


TABLE 17—DIMENSIONS OF FULL TUBULAR RIVETS

Head Style	Nominal Size	D Dia of Shank Max	D Dia of Shank Min	A Dia of Head Max	A Dia of Head Min	H Height of Head Max	H Height of Head Min	F Dia of Hole Max	F Dia of Hole Min	G Depth of Hole Min ⁽¹⁾	R Head Radius (Ref)
Oval	9/64	0.146	0.141	0.239	0.229	0.045	0.035	0.107	0.100	0.375	0.182
	9/64	0.146	0.141	0.318	0.306	0.045	0.035	0.107	0.100	0.375	0.313
Truss	3/16	0.188	0.182	0.381	0.369	0.065	0.055	0.141	0.134	0.375	0.324
	9/64	0.146	0.141	0.317	0.307	0.050	0.040	0.107	0.100	0.375	—
Countersunk ⁽²⁾	3/16	0.188	0.182	0.381	0.369	0.060	0.048	0.141	0.134	0.375	—

1. Full tubular rivets having length of 3/8 or shorter shall be drilled to head.

2. Angle of head not specified since it is assumed this type of rivet would generally be used in soft materials and therefore form its own countersink.

For dimensions and tolerances not specified above, see General Specifications.

5. General Specifications For Split Rivets

5.1 General—This standard covers the complete general and dimensional data for oval head and countersunk head split rivets. Design and assembly data are given in the Appendix—Rivet Selection and Design Considerations.

5.2 Heads—The bearing surface of oval head split rivets shall be at right angles to the axis of the body within 2 deg. Because the heads are not machined or trimmed, the circumference may be slightly irregular and the edges may be rounded or flat.

5.3 Material—Split rivets shall be low carbon steel, brass, or other metals as agreed upon between the purchaser and supplier.

5.4 Workmanship—Rivets shall be free from surface seams, and all other defects that might affect their serviceability.

5.5 Length—Rivet length shall be measured as indicated in the illustrations for each head style. Tolerance on length shall be as specified in Table 18.

TABLE 18—TOLERANCES ON LENGTH

Nominal Size	Rivet Length To and Including 4 x Dia Tolerance	Rivet Length Over 4 to and Including 8 x Dia Tolerance	Rivet Length Over 8 x Dia Tolerance
3/32	± 0.0007	± 0.008	± 0.010
1/8	± 0.007	± 0.010	± 0.015
9/64	± 0.010	± 0.012	± 0.015
3/16	± 0.010	± 0.012	± 0.015

SAENORM.COM : Click to view the full PDF of J492_196805

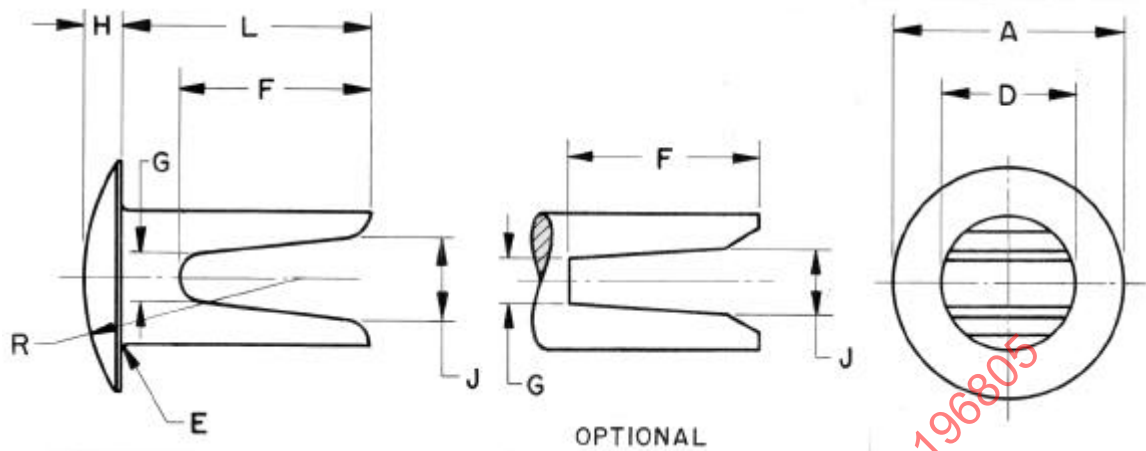


TABLE 19—DIMENSIONS OF OVAL HEAD SPLIT RIVETS

Nominal Size	D Dia of Shank Max	D Dia of Shank Min	A Dia of Head Max	A Dia of Head Min	H Height of Head Max	H Height of Head Min	E Radius of Fillet Max	R Radius of Head Ref	L ⁽¹⁾ Length of Rivet	F Depth of Slot ±0.015	Width of Slot G ±0.005	Width of Slot J ±0.005
3/32	0.092	0.086	0.151	0.141	0.027	0.019	0.010	0.130	3/16	0.156	0.030	0.037
									1/4	0.219	0.030	0.039
									5/16	0.250	0.030	0.039
									3/8 and over	0.312	0.030	0.039
1/8	0.122	0.114	0.223	0.213	0.037	0.027	0.014	0.210	3/16	0.156	0.040	0.047
									1/4	0.219	0.040	0.052
									5/16	0.266	0.040	0.057
									3/8 and over	0.312	0.040	0.057
9/64	0.152	0.144	0.317	0.307	0.049	0.037	0.018	0.304	3/16	0.156	0.050	0.060
									1/4	0.219	0.050	0.073
									5/16	0.281	0.050	0.078
									3/8	0.328	0.050	0.081
									7/16	0.344	0.050	0.083
									1/2 and over	0.391	0.052	0.077
3/16	0.195	0.185	0.350	0.338	0.064	0.050	0.022	0.300	1/4	0.219	0.065	0.120
									5/16	0.281	0.065	0.125
									3/8	0.312	0.065	0.127
									7/16	0.375	0.065	0.130
									1/2 and over	0.437	0.068	0.133

1. Lengths over those tabulated shall be in increments of 1/16 in.
For dimensions and tolerances not specified above, see General Specifications.

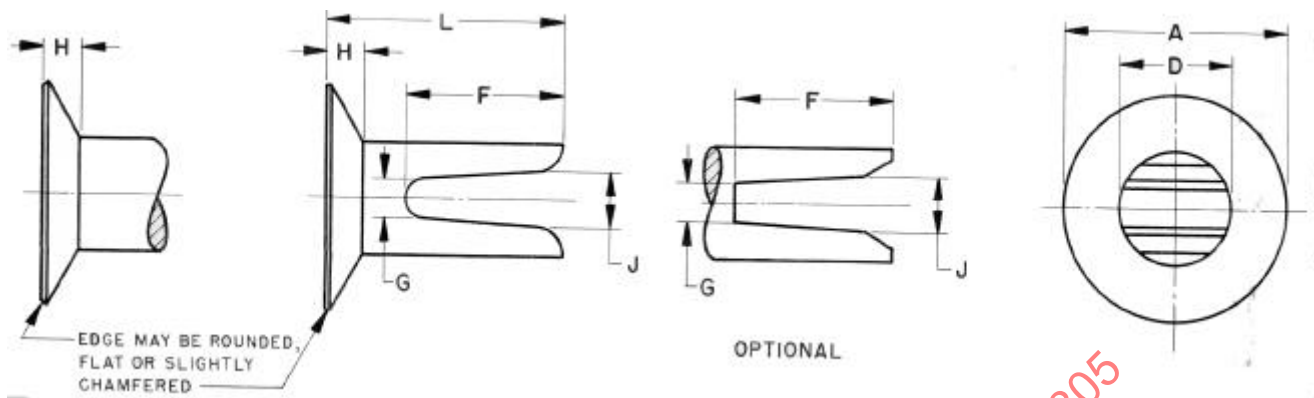


TABLE 20—DIMENSIONS OF COUNTERSUNK HEAD SPLIT RIVETS

Nominal Size	D Dia of Shank Max	D Dia of Shank Min	A Dia of Head Max	A Dia of Head Min	H Height of Head Max	H Height of Head Min	L Length of Rivet	F Depth of Slot ± 0.016	Width of Slot G ± 0.005	Width of Slot J ± 0.005
1/8	0.122	0.114	0.223	0.213	0.036	0.026	1/4	0.156	0.040	0.047
							5/16	0.219	0.040	0.052
							3/8	0.281	0.040	0.057
							7/16 and over	0.312	0.040	0.057
9/64	0.152	0.144	0.317	0.307	0.053	0.043	1/4	0.156	0.050	0.060
							5/16	0.219	0.050	0.073
							3/8	0.281	0.050	0.078
							7/16	0.328	0.050	0.081
							1/2	0.344	0.050	0.083
							9/16 and over	0.391	0.052	0.077
			0.380	0.370	0.062	0.052	1/4	0.156	0.050	0.060
							5/16	0.219	0.050	0.073
							3/8	0.281	0.050	0.078
							7/16	0.328	0.050	0.081
							1/2	0.344	0.050	0.083
							9/16 and over	0.391	0.052	0.077
3/16	0.195	0.185	0.443	0.431	0.061	0.051	5/16	0.219	0.065	0.120
							3/8	0.281	0.065	0.125
							7/16	0.312	0.065	0.127
							1/2	0.375	0.065	0.130
							9/16 and over	0.437	0.068	0.133

6. General Specifications For Rivet Caps

- 6.1 General**—This standard covers the complete general and dimensional data for rivet caps used with full tubular and split rivets where appearance is a consideration.
- 6.2 Materials**—Rivet caps shall be brass or steel, standard with manufacturer.
- 6.3 Workmanship**—Rivet caps shall be free from all defects that might affect their serviceability.

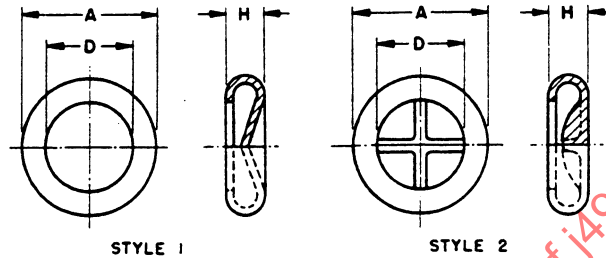


TABLE 21—DIMENSIONS OF RIVET CAPS

Style	D Dia of Hole Max	D Dia of Hole Min	A Outside Dia Max	A Outside Dia Min	H Height Max	H Height Min
1 ⁽¹⁾	0.233	0.203	0.288	0.258	0.098	0.068
	0.233	0.203	0.311	0.299	0.098	0.068
	0.233	0.203	0.358	0.346	0.098	0.068
2 ⁽²⁾	0.233	0.203	0.350	0.320	0.098	0.068
	0.281	0.251	0.442	0.412	0.129	0.099

1. Style 1 rivet caps are designed for use with split rivets.
 2. Style 2 rivet caps are designed for use with full tubular rivets.

7. General Specifications For Eyelets

- 7.1 General**—This standard covers the complete general and dimensional data for rolled flange eyelets. Design and assembly data are given in the Appendix—Rivet Selection and Design Considerations.
- 7.2 Flanges**—Flanges of eyelets shall not be eccentric with the shank by more than 0.0075 in.
- 7.3 Material**—Eyelets shall be brass, steel, or aluminum, standard with manufacturer.
- 7.4 Length**—Length of eyelets shall be measured as indicated in the illustration. They are available in length increments of 1/32 in. between the limits specified in Table 22.
- 7.5 Workmanship**—Eyelet end irregularities shall not be such that usability of the eyelet is impaired. Eyelets shall be free from surface seams, splits, and all other defects that might affect their serviceability.

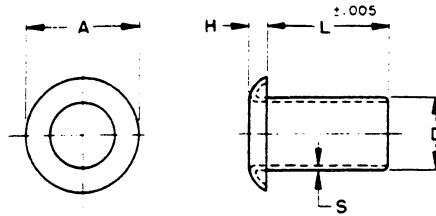


TABLE 22—DIMENSIONS OF EYELETS

Nominal Size	D Dia of Shank Max	D Dia of Shank Min	A Dia of Flange Max	A Dia of Flange Min	H Height of Flange Max	S ⁽¹⁾ Material Thickness	L Available Lengths Max	L Available Lengths Min
1/16	0.061	0.057	0.110	0.100	0.025	0.007	7/32	1/16
3/32	0.091	0.087	0.155	0.145	0.030	0.009	5/16	3/32
1/8	0.123	0.119	0.205	0.195	0.035	0.0095	11/32	3/32
5/32	0.154	0.150	0.250	0.240	0.040	0.010	11/32	3/32
3/16	0.185	0.181	0.295	0.285	0.045	0.0105	7/16	3/32
7/32	0.217	0.213	0.345	0.335	0.050	0.011	3/8	3/32
1/4	0.248	0.244	0.390	0.380	0.055	0.011	13/32	3/32

1. Thicknesses tabulated are those from which eyelets are fabricated; therefore, thickness at shank may be slightly less than specified values.

8. Notes

- 8.1 Marginal Indicia**—The change bar (I) located in the left margin is for the convenience of the user in locating areas where technical revisions have been made to the previous issue of the report. An (R) symbol to the left of the document title indicates a complete revision of the report.

PREPARED BY THE SAE FASTENERS COMMITTEE

APPENDIX A

RIVET SELECTION AND DESIGN CONSIDERATIONS

A.1 General—This appendix is a guide intended to aid the user in the proper selection and application of rivets as a fastening means. It consists of general information on the advantages of riveting, various methods of riveting, selection of rivets and design considerations.

A.2 Advantages of Riveting—Riveting as a means of fastening is popular because of its simplicity, dependability, and low cost. Where the parts to be assembled do not normally need to be disassembled and, in the case of tubular, semi-tubular and split rivets, the tensile and fatigue strength of the joinings made are not critical, riveting has many advantages. Some of the more outstanding of these are:

1. Metallic rivets are almost universally made by cold heading in high speed headers, and this makes a rivet a very economical fastener.
2. Investment in assembly equipment is low.
3. Maintenance costs of assembly equipment are low.
4. Rate of assembly is high and due to its simplicity, riveting lends itself to automation.
5. A minimum of skill is required to perform the operation.
6. Metallic or nonmetallic materials, or combinations thereof may be joined.
7. Rivets can be produced in a great variety of metals, ranging from low carbon steel to precious metals such as silver or gold.
8. Rivets may be used, not only as fasteners, but as functional components, such as pivots, electrical contacts, spacers, or supports.
9. Riveting normally requires no supplementary parts such as plain washers, lock washers, nuts, or safety wiring, nor are additional operations required such as assembly of nuts or locking devices as in the case of threaded fasteners.
10. Except for tubular, semitubular and split rivets, the rivet, when driven, usually fills the hole and prevents shifting of the parts joined.

A.3 Methods of Riveting—Riveting operations are performed by a number of methods, some of which are applicable only to particular types of rivets. The most commonly used methods are as follows:

A.3.1 Impact—This method employs a header die which strikes repetitive blows thus forming a head while the preformed end of the rivet is backed up with a tool called a buck or bucking bar. The header die may also be rotated while striking the repetitive blows. In machine riveting the buck is usually a part of the holding fixture. The method is applicable to solid rivets driven either hot or cold. Hot riveting is usually confined to large rivets used for structural purposes, while cold riveting is the method generally used for industrial applications on manufactured products. During the riveting operation the rivet material is displaced outward and downward into contact with the sides of the hole in which it is being assembled. The remainder of the material at rivet end forms the head. Upsetting of the shank can be controlled by using the proper impact force. See Figure A1.

A.3.2 Squeeze—As its name implies, this method consists of applying steady pressure with a formed header die while the preformed end of rivet is backed up with a buck which may be made a part of the holding fixture. This method is applicable to solid rivets driven hot or cold. As in the case of impact riveting, the rivet material is displaced outward and downward into contact with the sides of the hole in which it is being assembled. The remainder of the material forms the head. See Figure A2.

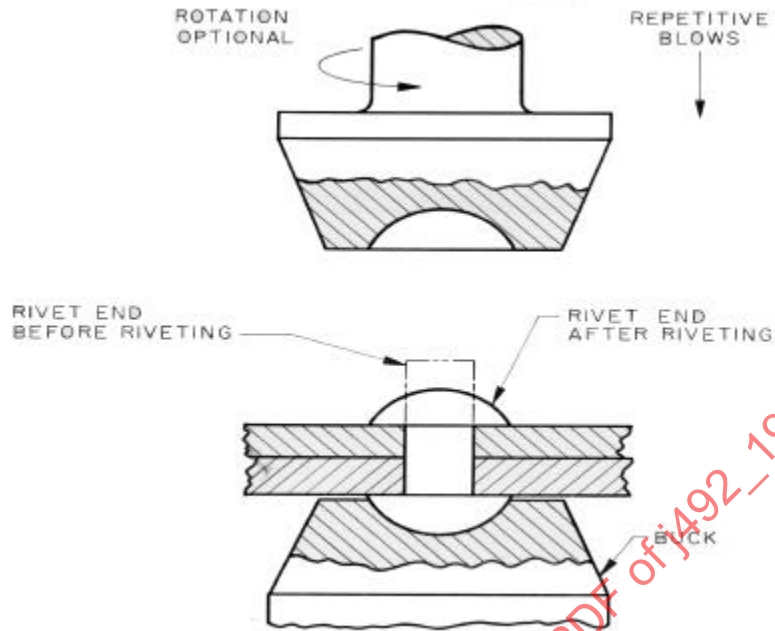


FIGURE A1—IMPACT RIVETING

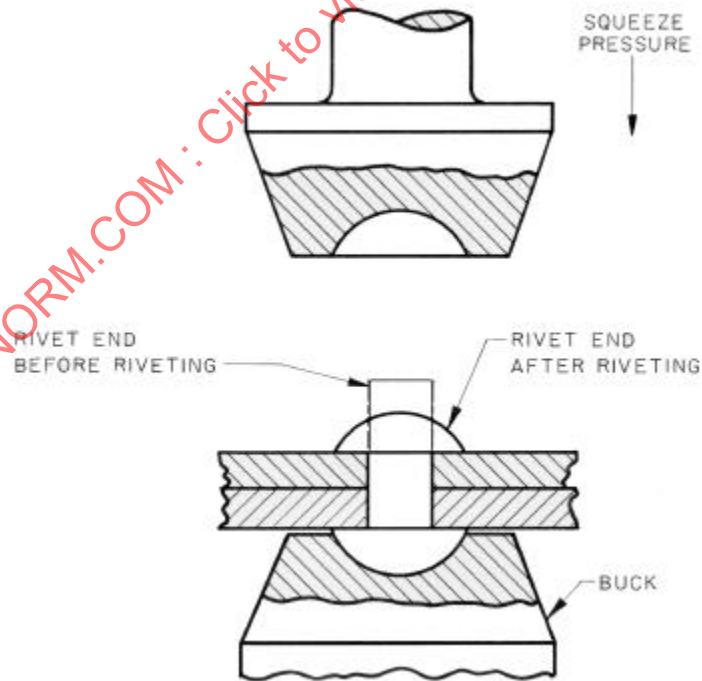


FIGURE A2—SQUEEZE RIVETING